

| Knight Piesold sample ID : | | | 10076 Lime precipitated Mn(OH) ₂ slurry 6/19/04 1/2 | | | | | | | | | | | | | | | | |
|---|----------|-----------|--|----------|-------------------------------------|-----------|-----------|---------|---------|----------|---------|----------|-------------------------------------|----------|--|--|--|--|--|
| Huffman | Huffman | slurry wt | + 50 ml DI | titrated | consumed | pH = vari | with DI | agitate | in soln | in soln | leached | titrated | consumed | pH = 4 | | | | | |
| Sample # | bottle # | gram | initial | to | 0.2N H ₂ SO ₄ | consumed | final vol | 24 hr | Mn | Mn | Mn | to | 0.2N H ₂ SO ₄ | consumed | | | | | |
| | | | pH | pH | ml | meq/gram | ml | pH | mg/l | Molar | ug/g | pH | ml | meq/gram | | | | | |
| 176204-01 | test 1 | 1.023 | 9.80 | 4.00 | 2.61 | 0.510 | 200 | 4.99 | 76.76 | 1.40E-03 | 15007 | 4.03 | 0.10 | 0.530 | | | | | |
| 176204-01 | test 2 | 2.029 | 9.83 | 4.01 | 5.50 | 0.542 | 200 | 5.09 | 138.6 | 2.52E-03 | 13662 | 4.09 | 0.10 | 0.552 | | | | | |
| 176204-01 | 1 | 10.010 | 10.21 | 8.97 | 1.00 | 0.020 | 200 | 7.67 | 28.4 | 5.17E-04 | 567 | | | | | | | | |
| 176204-01 | 2 | 10.050 | 10.25 | 8.02 | 14.70 | 0.293 | 200 | 7.16 | 364.9 | 6.64E-03 | 7262 | | | | | | | | |
| 176204-01 | 3 | 10.048 | 10.26 | 6.98 | 19.60 | 0.390 | 200 | 6.96 | 517.8 | 9.43E-03 | 10307 | | | | | | | | |
| 176204-01 | 4 | 10.040 | 10.26 | 7.02 | 20.10 | 0.400 | 200 | 7.03 | 527.4 | 9.60E-03 | 10506 | | | | | | | | |
| 176204-01 | 5 | 10.046 | 10.59 | 5.96 | 23.50 | 0.468 | 200 | 6.99 | 589.8 | 1.07E-02 | 11742 | 4.02 | 3.00 | 0.528 | | | | | |
| 176204-01 | 6 | 10.011 | 10.54 | 5.01 | 25.30 | 0.505 | 200 | 7.07 | 622.4 | 1.13E-02 | 12434 | 3.99 | 2.60 | 0.557 | | | | | |
| 176204-01 | 7 | 10.072 | 10.59 | 4.00 | 26.80 | 0.532 | 200 | 6.15 | 712.9 | 1.30E-02 | 14156 | 4.02 | 0.50 | 0.542 | | | | | |
| 176204-01 | 8 | 10.052 | 10.63 | 4.01 | 27.50 | 0.547 | 200 | 6.64 | 711.5 | 1.30E-02 | 14156 | 4.01 | 1.10 | 0.569 | | | | | |
| Slurry sample was vigorously shaken and multiple aliquots weighed into 250 ml polypropylene bottles. | | | | | | | | | | | | | | | | | | | |
| Deionized water was added (50.0 ml) to each bottle along with magnetic stir bars. | | | | | | | | | | | | | | | | | | | |
| Initial pH was measured with stirring and sample was titrated with 0.2N H ₂ SO ₄ to various pH's as shown. | | | | | | | | | | | | | | | | | | | |
| (pH's were not completely stable and continued to change as sample was stirred during and after titration) | | | | | | | | | | | | | | | | | | | |
| Acid volume versus pH titration curves were generated from the titrations and are reported separately. | | | | | | | | | | | | | | | | | | | |
| All titrated samples were diluted with DI water to a total volume of 200.0 ml, capped, and gently agitated for 24 hours. | | | | | | | | | | | | | | | | | | | |
| All samples were allowed to stand for an additional 24 hours to allow solids to settle and pH's measured. | | | | | | | | | | | | | | | | | | | |
| Aliquots of exactly 10.0 ml were removed from all samples and filtered through 0.2 um membrane filters. | | | | | | | | | | | | | | | | | | | |
| Filtered aliquots were analyzed by ICP-AES for total manganese in solution without further acidification. | | | | | | | | | | | | | | | | | | | |
| Remaining sample in the bottles was titrated to pH 4 for selected samples as shown to allow for comparison to initial titration curves. | | | | | | | | | | | | | | | | | | | |

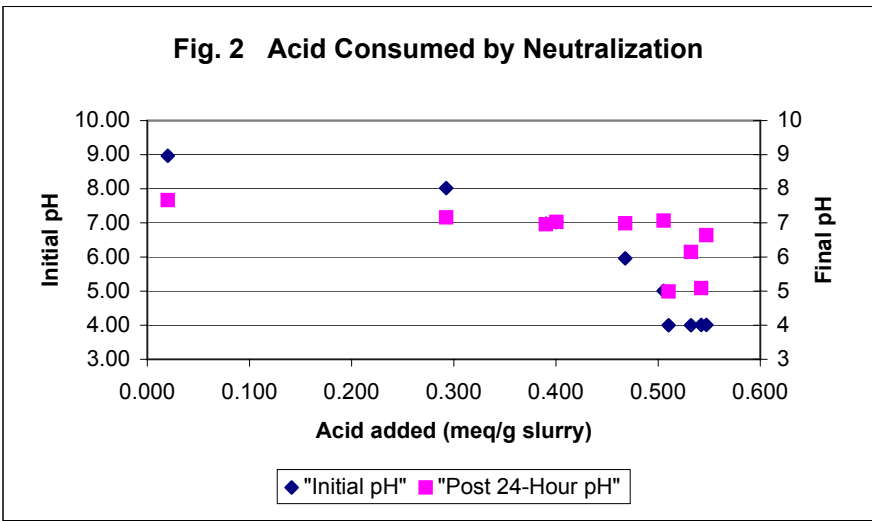
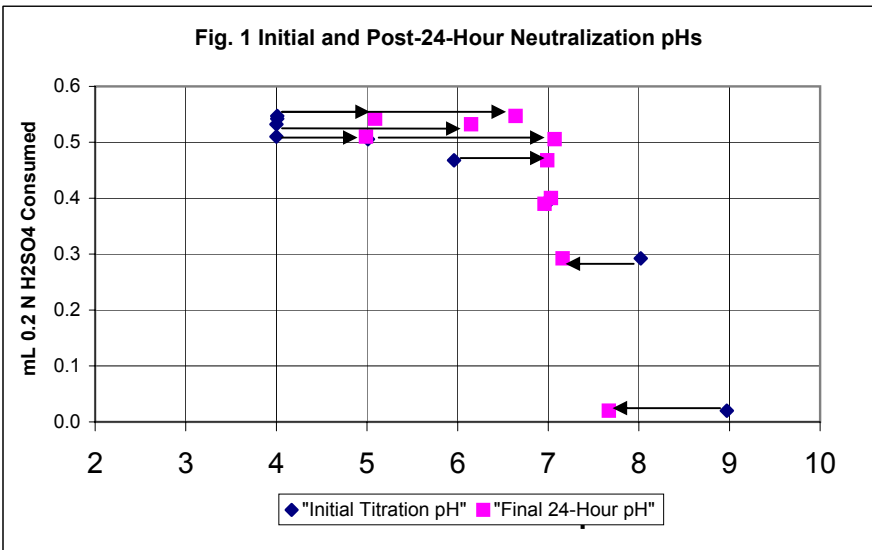


Fig. 3 Manganese Concentration in Liquid

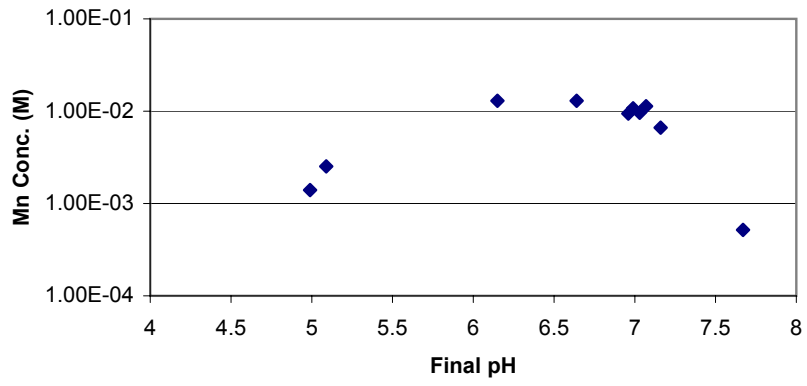


Fig. 4 Manganese Leached

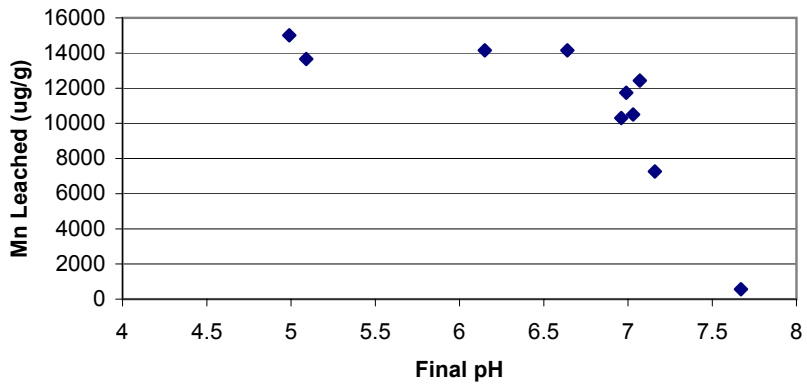


Fig. 5 Observed Manganese Solubility vs. Mn(OH)₂ Solubility

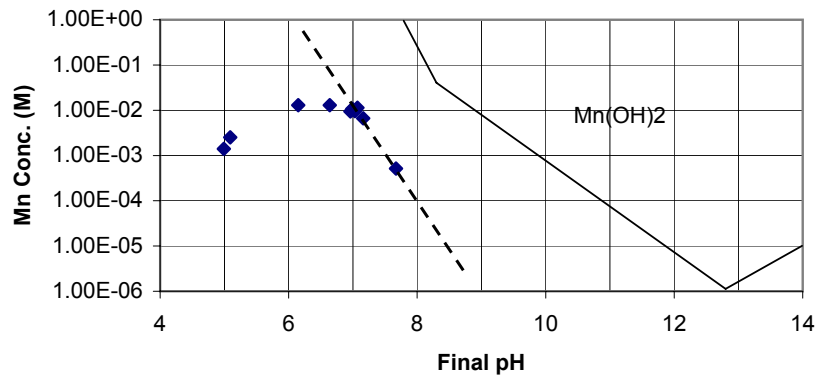


Fig. 6 Observed Manganese Solubility vs. Mn(OH)₂ Solubility

